Assignment 1

Textbook assignment: Chapter 1, "Straight Lines," pages 1-1 through 1-28.

Learning Objective:

Determine distances, divisions, slopes, inclinations, angles, and equations of straight lines.

1-1. Analytic geometry is the branch of mathematics that is concerned with the algebraic analysis of geometrical relationships.

1. True
2. False

1-2. In the rectangular coordinate system, an abscissa is a

1. number that describes a point
2. distance measured parallel to the Y axis
3. distance measured parallel to the X axis
4. distance measured perpendicular to the X axis

1-3. An ordinate is positive if it is a measurement in what direction from the origin?

1. To the right
2. To the left
3. Above
4. Below

1-4. The point M whose abscissa is 4 and ordinate is -3 is designated by

1. 4,-3
2. M(4,-3)
3. P(-3,4)
4. M(-3,4)

1-5. The abscissa and ordinate of a point are called the

1. intersection
2. mantissa of the point
3. coordinates of the point
4. Cartesian symbols of the point

1-6. The length of a line segment parallel to the X axis can be measured in the same manner as a line segment on the X axis.

1. True
2. False

1-7. Using the formula for finding the distance from one point to another in a coordinate system, what is the distance from point P to point Q if P has the coordinates P(0,2) and Q has the coordinates Q(6,10)?

1. 10
2. 14
3. $\sqrt{20}$
4. 100

1-8. What is the distance from the point T(8,3) to the point U(-3,5)?

1. $5\sqrt{5}$
2. $\sqrt{27}$
3. $\sqrt{117}$
4. $\sqrt{185}$

1-9. What is the initial error in the following step-by-step calculation of the distance from M(6,4) to N(-3,8) which resulted in the incorrect answer 5?

A. $\sqrt{(6 - 3)^2 + (4 - 8)^2}$
B. $\sqrt{3^2 + (-4)^2}$
C. $\sqrt{9 + 16}$
D. $\sqrt{25}$
E. 5

1. The square of -4 in C
2. The addition result in D
3. The extraction of the square root in E
4. The sign before the 3 in A

1-10. If point Q is located $\frac{1}{6}$ of the distance from point R to point S, what is the ratio of RQ to RS?

1. $\frac{6}{1}$
2. $\frac{1}{2}$
3. $\frac{1}{3}$
4. $\frac{1}{6}$

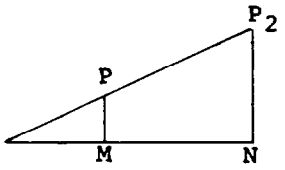

Figure 1A.--Similar triangles.

IN ANSWERING ITEM 1-11, REFER TO FIGURE 1A.

1-11. If the ratio of P_1M to P_1N is $\frac{1}{3}$, the ratio of P_1P to P_1P_2 is

1. $\frac{1}{6}$
2. $\frac{1}{3}$
3. $\frac{1}{2}$
4. $\frac{6}{1}$

1-12. Find the coordinates of point M one-third of the distance from P(3,8) to Q(3,5).

1. M(3,7)
2. M(4,7)
3. M(7,3)
4. M(7,4)

1-13. What are the coordinates of the midpoint M of the segment joining A(-4,-6) and B(8,10)?

1. M(0,0)
2. M(2,2)
3. M(-2,-2)
4. M(3,3)

1-14. In the rectangular coordinate system, the angle (α) the line crossing the X axis makes with the positively directed portion of the X axis, such that $0^\circ \leq \alpha < 180^\circ$, is called the

1. tangent
2. acute angle
3. reference angle
4. angle of inclination

1-15. The slope of any line is equal to the

1. angle of inclination
2. coordinate where it crosses the X axis
3. tangent of its angle of inclination
4. angle at the intersection of the line and the X axis

1-16. A line sloping downward and to the right has what kind of slope?

1. Zero
2. Negative
3. Positive
4. Infinite

1-17. The slope of a line is a ratio.

1. True
2. False

1-18. What is the slope m of a line connecting A(4,7) and B(-2,3)?

1. 0
2. $\frac{3}{5}$
3. $-\frac{3}{4}$
4. $\frac{2}{3}$

1-19. What change, if any, would occur in the answer to the previous item if A had the coordinates (-2,3) and B had the coordinates (4,7)?

1. There would be no change
2. The sign would be opposite
3. The slope of the line would be zero
4. The reciprocal of the answer would be true

1-20. The slope of a line parallel to the X axis is

1. 1
2. $\frac{1}{2}$
3. ∞
4. 0

1-21. The slope of a vertical line is not defined since the tangent of the line's angle of inclination increases without limit as the angle approaches

1. 90°
2. 0°
3. 180°
4. 45°

1-22. Which statement is true of two parallel lines in a rectangular coordinate system? They have the same

1. x intercept
2. y intercept
3. slope
4. coordinates

1-23. What is the relationship of the line between A(-1,-2) and B(1,-4) and the line between C(9,-1) and D(2,6)?

1. The lines are vertical
2. The lines are collinear
3. The lines are parallel
4. The lines are perpendicular

1-24. Points A, B, and C have the coordinates (3,6), (-89,0), and (2,13), respectively. What is the relationship of line segments AC and BC?

1. They are parallel
2. They are perpendicular
3. They are equal in length
4. They form an angle of 45°

In items 1-25 through 1-28, select from column B the set of lines that is appropriate to each description listed in column A.

A. DESCRIPTIONS	B. SETS
1-25. Lines having the same slope	1. Parallel lines
1-26. Slopes that are negative reciprocals	2. Perpendicular lines
1-27. Lines having the same angle of inclination	3. Lines having a positive slope
1-28. Lines that slope up and to the right	

1-29. If ϕ is the acute angle and ϕ' is the obtuse angle between lines L_1 and L_2, then

1. $\phi' = \phi$
2. $\phi' - \phi = 180^\circ$
3. $\phi' + \phi = 180^\circ$
4. $\phi' + \phi = 90^\circ$

1-30. If lines L_1 and L_2 have slopes of 2 and 6, respectively, what is the size of the acute angle between them?

1. $6^\circ\ 17'$
2. $17^\circ\ 6'$
3. $28^\circ\ 13'$
4. 176°

1-31. The size of the acute angle between L_1, which has a slope of 8, and L_2, which is parallel to the X axis is

1. $82^\circ\ 53'$
2. $97^\circ\ 7'$
3. 108°
4. 118°

1-32. What is the size of the obtuse angle formed by line L_1, whose slope is $\frac{1}{3}$, and line L_2, whose slope is undefined or ∞?

1. $8^\circ\ 26'$
2. $98^\circ\ 6'$
3. 100°
4. $108^\circ\ 26'$

1-33. The equation $y - y_1 = m(x - x_1)$ is called the

1. slope formula
2. quadratic formula
3. equation of a line whose slope is x_1
4. point-slope form of the equation of a line

1-34. The equation of a line through (3,8) which has a slope of 2 is

1. $3x + 8y = 0$
2. $2x - y + 2 = 0$
3. $2x + 2y - 2 = 0$
4. $2y - x + 2 = 0$

1-35. Using the point-slope form of the equation of a line, under which of the following conditions can you determine a linear equation?

1. One point on the line and the slope of the line are known
2. Two points on the line and the slope of the line are known
3. Two points on the line are known
4. All of the above

1-36. What is the equation of a line through points (3,3) and (-4,2)?

1. $x + y - 18 = 0$
2. $x + 7y - 18 = 0$
3. $x - 7y + 18 = 0$
4. $7x - y + 18 = 0$

1-37. Any line that is not perpendicular to the X axis intersects the Y axis at

1. no point
2. some point
3. all points
4. two points

1-38. The x coordinate of the point at which any line crosses the Y axis is always

1. zero
2. positive
3. negative
4. the same as the y coordinate

1-39. The equation $y = mx + b$ is called the slope-intercept form of the equation of a line.

1. True
2. False

1-40. Which of the following data, if known, is sufficient to permit the general form $y = mx + b$ to be used in finding the equation of a line?

1. One point on the line
2. The slope of the line
3. The y intercept of the line
4. The slope of the line and its y intercept

1-41. What is the slope of the line whose equation is $5y = 15x + 11$?

1. $\frac{11}{5}$
2. 11
3. 3
4. 15

1-42. The line whose y intercept is (0,3) and whose slope is $\frac{1}{6}$ has what equation?

1. $x = 6y + 18$
2. $6y = x + 18$
3. $6x = y - 18$
4. $6x + 6y - 1 = 0$

1-43. In using the normal form to write the equation of a line, what information must you know about the desired line?

1. The slope and the y intercept
2. One point on the line and the slope
3. Two points on the line and the perpendicular distance from the origin to the line
4. The perpendicular distance of the line from the origin and the angle the perpendicular makes with the positive side of the X axis

1-44. Which of the following is the equation of a line if the perpendicular distance from the origin is 4 units and the angle between the perpendicular and the positive side of the X axis is 60°?

1. $\sqrt{3} = 8x - y$
2. $8 = x\sqrt{3} + y$
3. $8 = x + y\sqrt{3}$
4. $8x - y = 2$

1-45. What is the equation of a line parallel to $2x + y - 6 = 0$ and passing through (4,6)?

1. $y = x + 8$
2. $y = 2x + 16$
3. $2y - x - 8 = 0$
4. $2x + y - 14 = 0$

1-46. Which of the following is the equation of a line perpendicular to $2x + y - 6 = 0$ and passing through (4,6)?

1. $2x + y - 14 = 0$
2. $2y - x - 8 = 0$
3. $y = x + 8$
4. $y = 2x + 16$

1-47. The formula $d = \left| \frac{x_1A + y_1B + C}{\sqrt{A^2 + B^2}} \right|$ is used to find the

1. normal to a line
2. general equation of a line
3. distance between two points
4. distance from a point to a line

1-48. What is the distance from $(-2,0)$ to the line whose equation is $8x - 3y + 2 = 0$?

1. $\frac{14\sqrt{73}}{73}$
2. $-\frac{14\sqrt{73}}{73}$
3. $\frac{\sqrt{73}}{14}$
4. 14

1-49. What is the distance from $(-3,2)$ to the line whose equation is $x + 2y - 8 = 0$?

1. $\frac{\sqrt{5}}{5}$
2. $\sqrt{5}$
3. $\frac{7\sqrt{5}}{5}$
4. $\frac{7}{5}$

1-50. What is the distance from $(5,\sqrt{7})$ to the line whose equation is $\sqrt{7}y = 3x$?

1. -2
2. 2
3. $5\frac{1}{2}$
4. $\frac{\sqrt{7}}{2}$